Abstract

Title: Human locomotion after total hip replacement

Objectives: The aim of this thesis is to perform a gait analysis of patients after total hip replacement and to find out, how chosen temporo-spatial, kinetic and kinematic parameters change during the first half a year after the surgery. The deviations found in gait stereotypes of individual patients are further compared with results of international studies.

Methods: The thesis is theoretical-empirical, with small number of patients. 3D kinematic gait analysis was performed by Qualisys system and ground reaction forces by two Kistler force plates. The following parameters are being monitored: length of step, stance phase duration, cadence, walking speed, lateral shift of the pelvis and trunk in standing phase, contralateral pelvic drop in standing phase of the leg, maximum range of motion of the hip joint in sagital plain, maximum of vertical and medio-lateral component of the ground reaction forces in the standing phase.

Results: The highest side deviations between legs were found in 3 months after the surgery and remained until 6,5 months after the surgery. In this time period a lower value of the length of step, stance phase duration, maximum range of motion of the hip joint in sagital plain and also a higher lateral shift of the pelvis was measured on the operated leg of both patients in comparison with the healthy leg. There was also a gradual increase in the values of walking speed and cadence (with an exception of the cadence of a woman in 6,5 month) during a half year period after total hip replacement. On the operated leg were, in most cases, observed lower values of the maximum of the vertical reaction forces and there were also higher values of the maximum of the medio-lateral reaction forces by men.The measured values are corresponding to the results of mentioned studies, or are even higher.

Key words: gait, total hip replacement, pelvis, 3D kinematic analysis, Qualisys